WHAT IS CLAIMED IS:

1. A method of improving the planarity of a support plate of a susceptor for use during deposition of a film of material onto a substrate comprising the steps of:

reducing pressure in a hollow core of a shaft to a level below atmospheric pressure; and

reducing a pressure in the deposition chamber to a level required for the deposition of the film of material onto the substrate;

wherein the pressure in the hollow core of the shaft acts upon a lower surface of the support plate connected to the shaft and interfacing with the hollow core of the shaft and the pressure in the deposition chamber acts upon an upper surface of the support plate adapted to support the substrate thereby improving planarity.

2. The method of claim 1, wherein reducing the pressure in the hollow core of the shaft comprises the steps of:

sealing the hollow core of the shaft from atmospheric pressure; and

applying a source of negative pressure to the hollow core of the shaft thereby reducing the pressure in the hollow core.

3. The method of claim 2, wherein the hollow core is sealed by a shaft vacuum connector housing, wherein the shaft

vacuum connector housing is adapted to connect with the source of the negative pressure.

4. The method of claim 3, wherein the shaft vacuum connector housing comprises a fitting adapted to be connected to the source of negative pressure, the negative pressure being applied to the hollow core through the fitting.

5. The method of claim 1, wherein the upper surface further comprises a plurality of openings passing therethrough and adapted to affix the substrate to the upper surface by applying a vacuum thereto, wherein the plurality of openings are fluidly connected with a vacuum line passing through the hollow core of the shaft.

6. The method of claim 5, wherein the vacuum line connected to the plurality of openings has a negative pressure generated therein and controlled independently from the negative pressure generated in the hollow core of the shaft.

7. The method of claim 1, wherein the chamber pressure is from about 0.5 Torr to about 6 Torr.

8. The method of claim 1, wherein the pressure inside the hollow core of the shaft is reduced below about 200 Torr.

9. The method of claim 8, wherein the pressure inside the hollow core of the shaft is reduced to about 0.5 Torr to about 200 Torr.

10. The method of claim 9, wherein the pressure inside the hollow core of the shaft is brought to a value about equal to the chamber pressure.

11. A method of improving the planarity of a support plate of a susceptor for use during deposition of a film of material onto a substrate comprising the steps of:

reducing a pressure in the deposition chamber to about 0.5 Torr to about 200 Torr;

sealing a hollow core of a shaft from atmospheric pressure with a shaft vacuum connector housing, wherein the shaft vacuum connector housing comprises a fitting adapted to connect to a source of negative pressure;

applying the source of negative pressure to the hollow core of the shaft through the fitting; and

reducing pressure in the hollow core of the shaft through the fitting from about 0.5 to about 200 Torr,

wherein the pressure in the hollow core of the shaft acts upon a lower surface of the support plate connected to the shaft and interfacing with the hollow core of the shaft and the pressure in the deposition chamber acts upon an upper surface of the support plate adapted to support the substrate thereby improving planarity.

12. The method of claim 11, wherein the upper surface further comprises a plurality of openings passing therethrough and adapted to affix the substrate to the upper surface by applying a vacuum thereto, wherein the plurality of openings are fluidly connected with a vacuum line passing through the hollow core of the shaft.

13. The method of claim 12, wherein the vacuum line connected to the plurality of openings has a negative pressure generated therein and controlled independently from the negative pressure generated in the hollow core of the shaft.

14. The method of claim 11, wherein the pressure inside the hollow core of the susceptor shaft is brought to a value about equal to the chamber pressure.

15. A susceptor for use in a deposition chamber for depositing a film of material onto a substrate, the susceptor comprising:

a support plate mounted on a shaft having a hollow core, the support plate having an upper surface adapted to support a substrate and a lower surface connected to the shaft and interfacing with the hollow core; wherein the hollow core is sealed from atmospheric pressure; and

an input for applying negative pressure inside the hollow core and interfacing with the lower surface of the substrate support plate.

16. The susceptor of claim 15, further comprising a shaft vacuum connector housing which seals the hollow core from atmospheric pressure.

17. The susceptor of claim 16, wherein the shaft vacuum connector housing has the input located thereon.

18. The susceptor of claim 15, wherein the substrate support plate further comprises a plurality of openings passing through the upper surface and adapted to affix a substrate to the upper surface by applying a vacuum thereto, the plurality of openings being fluidly connected with a vacuum line passing through the hollow core of the shaft.

19. The susceptor of claim 18, wherein the negative pressure generated in the vacuum line connected to the plurality of openings is controlled independently of the negative pressure developed inside the hollow core of the shaft and interfacing with the lower surface of the support plate.

20. The susceptor of claim 18, wherein the vacuum line connected to the plurality of openings is connected to a vacuum source which is independent of a vacuum source connected to the input for developing the negative pressure inside the hollow core of the shaft and interfacing with the lower surface of the support plate.

21. A susceptor for use in a deposition chamber for depositing a film of material onto a substrate, the susceptor comprising:

a support plate mounted on a shaft having a hollow core, the support plate having an upper surface adapted to support a substrate and a lower surface connected to the shaft and interfacing with the hollow core;

a shaft vacuum connector housing; the shaft vacuum connector housing sealing the hollow core from atmospheric pressure; and

an input located on the shaft vacuum connector housing, the input applying negative pressure inside the hollow

core and interfacing with the lower surface of the substrate support plate.

22. The susceptor of claim 21, wherein the substrate support plate further comprises a plurality of openings passing through the upper surface and adapted to affix a substrate to the upper surface by applying a vacuum thereto, the plurality of openings being fluidly connected with a vacuum line passing through the hollow core of the shaft.

23. The susceptor of claim 22, wherein the negative pressure generated in the vacuum line connected to the plurality of openings is controlled independently of the negative pressure developed inside the hollow core of the shaft and interfacing with the lower surface of the support plate.

24. The susceptor of claim 23, wherein the vacuum line connected to the plurality of openings is connected to a vacuum source which is independent of a vacuum source connected to the input for developing the negative pressure inside the hollow core of the shaft and interfacing with the lower surface of the support plate.

25. A method of depositing a film of material onto a substrate comprising the steps of:

affixing the substrate to an upper surface of a support plate of the susceptor of claim 15 in a deposition chamber;

reducing a pressure in the deposition chamber to a deposition pressure;

reducing a pressure inside a hollow core of a shaft of the susceptor to below atmospheric pressure wherein the pressure in the hollow core of the shaft is applied to a lower surface of the support plate of the susceptor;

flowing at least one precursor gas into the deposition chamber; and

depositing a film onto the substrate wherein the film is generated at least in part from the at least one precursor gas.

26. The method of claim 25, further comprising the step of:

bringing the temperature inside the deposition chamber to at least 300 °C.

27. The method of claim 26, wherein the temperature is brought to about 400 °C to about 450 °C.

28. The method of claim 25, wherein the pressure in the deposition chamber is from about 0.5 Torr to about 6 Torr.

29. The method of claim 28, wherein the pressure in the hollow core of the shaft is reduced to below about 200 Torr.

30. The method of claim 29, wherein the pressure in the hollow core of the shaft is brought to a value equal to the pressure in the deposition chamber.

31. The method of claim 25, further comprising the steps of:

monitoring the deposition pressure and the pressure inside the hollow core of the shaft; and

adjusting the pressure inside the hollow core of the shaft when it exceeds a value outside a predetermined value range relative to the pressure in the deposition chamber.

32. The method of claim 25, further comprising the steps of:

monitoring the planarity of a surface of the substrate onto which the film is to be deposited; and

adjusting the pressure inside the hollow core of the shaft when the surface of the substrate deforms by more than a predetermined acceptable amount from perfectly planar thereby bringing the susceptor and the substrate back within acceptable planarity limits.

33. A method of depositing a film on a substrate comprising the steps of:

affixing a substrate to an upper surface of a support plate of the susceptor of claim 15 in a deposition chamber;

bringing the temperature inside the deposition chamber to at least 300 °C;

reducing a pressure in the deposition chamber to about 0.5 Torr to about 6 Torr;

reducing a pressure inside a hollow core of a shaft of the susceptor from about 0.5 Torr to about 200 Torr wherein the pressure in the hollow core of the shaft is applied to a lower surface of the support plate of the susceptor;

flowing at least one precursor gas into the deposition chamber;

depositing a film onto the substrate wherein the film is generated at least in part from the at least one precursor gas;

monitoring the deposition pressure and the pressure inside the hollow core of the shaft; and

adjusting the pressure inside the hollow core of the shaft when it exceeds a value outside a predetermined value range relative to the pressure in the deposition chamber during deposition of the film of material onto the substrate.

34. The method of claim 33, wherein the temperature is brought to about 400 °C to about 450 °C.

35. The method of claim 33, wherein the pressure in the hollow core of the shaft is brought to a value equal to the pressure in the deposition chamber.

36. A method of depositing a film on a substrate comprising the steps of:

affixing a substrate to an upper surface of a support plate of the susceptor of claim 15 in a deposition chamber;

bringing the temperature inside the deposition chamber to at least 300 °C;

reducing a pressure in the deposition chamber to about 0.5 Torr to about 6 Torr;

reducing a pressure inside a hollow core of a shaft of the susceptor from about 0.5 Torr to about 200 Torr wherein the pressure in the hollow core of the shaft is applied to a lower surface of the support plate of the susceptor;

flowing at least one precursor gas into the deposition chamber;

depositing a film onto the substrate wherein the film is generated at least in part from the at least one precursor gas;

monitoring the planarity of a surface of the substrate onto which the film is to be deposited; and

adjusting the pressure inside the hollow core of the shaft when the surface of the substrate deforms by more than a predetermined acceptable amount from perfectly planar thereby bringing the susceptor and the substrate back within acceptable planarity limits during deposition of the film of material onto the substrate.

37. The method of claim 36, wherein the temperature is brought to about 400 °C to about 450 °C.

38. The method of claim 33, wherein the pressure in the hollow core of the shaft is brought to a value equal to the pressure in the deposition chamber.